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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,975	06/27/2005	Kiyohito Murata	07057.0105-00000	9214

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EXAMINER	
BALL, JOHN C	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,975	MURATA, KIYOHITO	
	Examiner	Art Unit	
	J. CHRISTOPHER BALL	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2009 and 17 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 17, 2008, has been entered.

2. Claims 1-10 and 16 are pending and have been fully considered.

3. The Examiner wishes to note the incorrect name association of the prior art references cited in previous Office Actions and are corrected herewithin:

    - JP H11-122950, A, previously referred to as "KATSUMI et al." or "KATSUMI" should properly be referred as "AMADA et al." or "AMADA"
    - JP H11-036981, A, previously referred to as "KAZUHIKO et al. " or "KAZUHIKO" should properly be referred to as "SHINOHARA et al." or "SHINOHARA".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-4, 8-10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over AMADA et al. (Japanese Patent Application Publication JP H11-122950, A), as evidenced by an Internet webpage regarding Modulus of Rigidity from The Engineering Tool Box (http://www.engineeringtoolbox.com/modulus-rigidity-d_946.html, access on March 6, 2009; herein after referred to as "WEBPAGE").

Regarding claim 1, AMADA discloses an exhaust heat electrical generating apparatus comprising:

a thermoelectric converting unit that converts thermal energy of exhaust gas into electrical energy (element 33 in Drawing 2);

a heat exchange unit (elements 21 and 19 in Drawing 2) on one surface of the thermoelectric converting unit to conduct thermal energy from the exhaust gas that follow through an exhaust pipe (paragraph [0015]); and

a cooling unit on the other surface of the thermoelectric converting unit (element 13a in Drawing 2).

AMADA also teaches that the heat exchange unit (elements 21 and 19 in Drawing 2) can be fabricated from stainless steel, cooper, aluminum, aluminum alloys, iron, carbon steel, Monel, among other materials. It would be understood by one of skill in the art that the thermoelectric converting unit disclosed by AMADA is semiconductor device, fabricated from silica or like materials. AMADA does not specifically state the fabrication material of the cooling unit. However, AMADA teaches that the cooling unit may comprise, in addition to an air cooled design, a water cooled jacket structure or a refrigerant cooled system (paragraph [0052]). It would be obvious to one of ordinary skill in the art that a water cooled jacket structure or refrigerant cooled system should be fabricated from a material which would prevent the corrosion of the cooling unit and failure of the entire system. AMADA teaches such a corrosion preventing material is stainless steel (paragraph [0050]). Therefore, one of ordinary skill, based on the teachings of AMADA could fabricate an exhaust heat electrical generating apparatus embodiment, among other embodiments, with a silica-based thermoelectric

converting unit, having a modulus of rigidity (MOR) value of about 19 GPa (WEBPAGE); a heat exchange unit fabricated from either aluminum alloys (MOR = 27 GPa; WEBPAGE), copper (MOR = 45 GPa; WEBPAGE), iron (MOR as high as 66 GPa; WEBPAGE), carbon steel (MOR = 77 GPa; WEBPAGE), or Monel (MOR = 66 GPa; WEBPAGE); and a stainless steel cooling unit (MOR = 77.2 GPa; WEBPAGE). This obvious embodiment would have a cooling unit with the highest rigidity among itself, the heat exchange unit, and the thermoelectric converting unit.

Regarding claim 2, AMADA teaches a heat exchange unit that includes a heat exchange fin for collecting the thermal energy of the exhaust gas (element 21 in Drawing 2) and a base (element 19 in Drawing 2) having one surface (element 19a in Drawing 2) attached to the heat collected fins (i.e., the heat exchange unit) and the other surface is in contact with the thermoelectric converting unit. AMADA also teaches the exhaust pipe includes a main body that forms a frame of an exhaust passage, which is the inner shell (element 19 in Drawings 2 and 3), which is the base of the heat exchange unit, and the heat exchange fins are disposed therein (element 21 in Drawings 2 and 3); therefore, exhaust passage is constructed by the exhaust pipe and the heat exchange unit as they are one and the same (element 19 & 21 in Drawings 2 and 3). AMADA also teaches that heat exchange fins and base component are manufactured in the described embodiment from stainless steel (paragraph [0063]), but one of

ordinary skill in the art would recognize that the heat exchange unit components can be fabricated from a number of different metals, including those that were less rigid than stainless steel (paragraph [0063]). Therefore, one skilled in the art could produce a base which is constructed from a more rigid material than that of the exhaust passage.

Regarding claim 3, AMADA teaches the main body of the exhaust pipe, i.e., the inner shell (element 19 in Drawings 2 and 3) can be formed from a number of metals to address thermal conductivity (paragraph [0063]), and therefore could be chosen to be constructed of a material with a thermal expansion ratio lower than the other component of the heat exchange unit, namely the heat collection fins (element 21 in Drawings 2 and 3).

Regarding claim 4, AMADA teaches the main body of the exhaust pipe manufactured in one of the described embodiment is fabricated from stainless steel (paragraph [0063]).

Regarding claim 8, AMADA teaches a configuration of the exhaust heat electrical generating apparatus where the heat exchange fins are configured in a plurality where some of the fins are disposed 180 degrees from each other (elements 21, 21a, and 21b in Drawings 3-7), i.e., they are disposed at a different pitch.

Regarding claim 9, AMADA teaches that the heat exchanging fins (elements 21, 21a, and 21b in Drawings 3-7) can consists of two kinds of stainless steel plates (paragraph [0053]) that would inherently exhibit different heat conductivities.

Regarding claim 10, AMADA teaches the main body of the exhaust pipe, i.e., the inner shell (element 19 in Drawings 2 and 3) and the heat exchange fins (element 21 in Drawings 2 and 3) can be formed from a number of metals and/or ceramic, so to address endurance, thermal conductivity, and heat deformation (paragraph [0063]). Therefore, it would be obvious to one of ordinary skill to choose construction material to give a configuration where the heat exchange unit (i.e., heat collection fin) deformation would be in an opposite direction from an exhaust pipe deformation to keep proper spacing for heat exchange.

Regarding claim 16, AMADA teaches the cooling unit is in thermal contact with the thermoelectric converting unit (paragraph [0051]).

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over AMADA et al. (Japanese Patent Application Publication JP H11-122950, A), as evidenced by an Internet webpage regarding Modulus of Rigidity from The Engineering Tool Box (http://www.engineeringtoolbox.com/modulus-rigidity-

d_946.html, access on March 6, 2009; herein after referred to as "WEBPAGE") as applied to claims 1-4, 8-10, and 16 above, and further in view of SHINOHARA et al. (JP H11-036981, A).

Regarding claims 5-7, AMADA teaches the limitations of Claim 2, as outlined above.

AMADA also teaches the exhaust pipe in the center of the apparatus (Drawing 2), the thermoelectric converting unit on the outer periphery of the heat exchange unit attached to the main body of the exhaust pipe (Drawing 2), and the cooling unit on the outer periphery of the thermoelectric converting unit (Drawing 2). AMADA teaches the thermoelectric unit is formed by a plurality of thermoelectric units (element 33 and all like unlabeled elements, Drawing 2).

AMADA does not teach an elastic member on the outer side of the cooling unit, an elastic system, a unit of elastic system structured based on the thermoelectric module, nor that the elastic member includes a spring and a compression member which are one of in point contact and line contact with each other.

However, KAZUHIKO discloses an exhaust heat power generating device, wherein is taught elastic members on the outer side of the cooling unit (elements 100 and 110 in Drawing 7) and these members are part of a system for fixing the thermoelectric converting unit by applied pressure to the cooling unit externally by the elastic member (paragraph [0051]). KAZUHIKO also teaches the elastic

system is structured based on the module of the thermoelectric converting units as evidenced in Drawings 6 and 7, where elements 10b, 11b, 100b, and 110b represent "breakthroughs" corresponding to the plurality of thermoelectric elements. KAZUHIKO et al. also teaches the elastic member includes a spring material and compression member in contact (paragraphs [0051] - [0053]). AMADA and KAZUHIKO are analogous art, in that they deal with the same technology area, thermoelectric exhaust gas power generators.

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the exhaust heat electrical generating apparatus of AMADA with the elastic system elements of KAZUHIKO because to do so allows any thermal expansion to be eased (KAZUHIKO et al., paragraph [0051]).

Response to Arguments

8. Applicant's arguments, see Remarks, p. 6, filed December 17, 2008, with respect to claim1-10 have been fully considered and are persuasive. The 35 USC 112th, second paragraph rejection of claims 1-10 has been withdrawn.

9. Applicant's arguments, see Remarks, p. 6-8, filed December 17, 2008, with respect to the rejection(s) of claim(s) 1-10 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in

view of evidence provided by an Internet webpage from The Engineering Tool Box regarding Modulus of Rigidity of materials recited in the prior art, AMADA.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. CHRISTOPHER BALL whose telephone number is (571)270-5119. The examiner can normally be reached on Monday through Thursday, 8:00 am to 5:00 pm (EDT).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCB
AU 1795
03/08/2009

/Alex Noguerola/

Primary Examiner, Art Unit 1795

March 9, 2009